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ABSTRACT

A set of career cluster standards was developed for the school-to-careers division of a large urban school district that is moving toward a career academy model for high school education. The process used to develop the standard was based on a standards development model consisting of the following stages: synthesis; collection of input; and validation. In the synthesis stage, career content skills analyses developed by local community college faculty were reviewed along with related industry skills standards and existing national and state standards. General employability and career-specific standards that had been well validated and developed through broad-based, inclusive processes that included industry were emphasized. Next, input was collected from educators and industry through focus groups and a review of the draft standards. During a weeklong summer institute, more than 70 high school teachers reviewed, discussed, and provided input into the standards for their career cluster. In the validation stage, nearly 300 local educators and industry representatives participated in a written survey as an initial validation of the revised standards. The standards format included the following types/levels of standards: employability skill standards; technical content standards; and academic standards. Standards were developed for 12 career clusters and subjected to external validation. (Contains 16 tables/figures.) (MN)

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Building Foundations for Academic Success in School-to-Career Systems

April, 2001

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Introduction

A primary task for standards-based instructional and assessment systems is identification of career pathways linked to locally relevant economic development areas and career cluster standards that define meaningful, relevant, and appropriate knowledge and skills for students. Career cluster standards define what students should know and be able to do for entry into and success in programs in the career pathway, as well as the world of work. Such standards-based systems can bridge the gap between school, workplace, postsecondary education, and social environments (Oliver et al., 1997; WestEd, 1998; AYPF & CWD, 2000).

This proposal describes the development and validation of career cluster standards for the school-to-career division of a large urban school district (about 55,000 students) that is moving towards a career academy model for high school education. The career academies employ integrated curriculum, project-based learning, and student internships to support student learning in a wide range of career areas. The district is focusing on establishing rigorous academic expectations for all students, whether or not they attend career academies, and providing multiple opportunities to enhance students' attainment of employability and occupation-specific skills.

Based on our understanding of the project's objectives and our experience in undertaking similar standards-related projects, we used three guiding principles in framing our work:

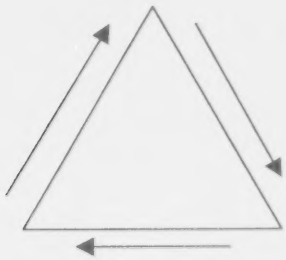
- Inclusion is a key component of success. All affected constituencies (high school, higher education, industry) should be invited to participate as fully and as early in the process as possible.
- Standards should incorporate high levels of academic skills (at least high school graduation, work or college ready) yet have fidelity to the needs of the workplace.
- Final products should be attractive and easily used by teachers and administrators for curriculum and assessment development.

Methodology

Following these guiding principles we pursued a three-phase development process of synthesis, collecting input, and validation. Our model for development is presented and described below.

A Model for Standards Development

Input
Collect input from educators and industry through focus groups and review of draft standards. Focus on inclusion of all constituencies and attractive and easy-to-use formats.



Synthesize
Synthesize skills analyses, industry standards, national and state standards, O*Net, SCANS. Draft initial standards. Focus on high expectations and workplace relevancy.

Validate
Validate revised standards through a written survey. Focus on inclusion of all constituencies, high expectations, and workplace relevancy.

- *Synthesis*: We reviewed career content skills analyses developed by local community college faculty and identified and reviewed related industry skills standards, national and state standards, O*Net, and SCANS. We focused on general employability and career-specific standards that had been well-validated and developed through broad-based, inclusive processes that included industry. Those skill standards were crosswalked and synthesized with lists of the essential knowledge, skills, and abilities for the range of occupations represented in each of the career clusters drawn from O*Net, an on-line database available through the U.S. Department of Labor. This process produced draft standards (employability and technical content) for each of the twelve career clusters with a focus on high expectations and workplace relevancy.

- *Collecting input*: We collected input from educators and industry through focus groups and review of the draft standards. Sixty-four industry representatives and educators participated in this process. During interactive discussions, participants changed, revised and added specific standards and performance indicators. Participants considered the standards overall in light of the validity, comprehensiveness, and appropriateness of the employability and technical skills and sample performance indicators for preparing students for entry into and success in the career pathway represented in the standards. Additionally, during a week-long summer institute, over 70 high school teachers reviewed, discussed, and provided input into the standards for their career cluster. Our input process focused on inclusion of all constituencies and development of attractive and easy-to-use formats.

- *Validation*: Nearly 300 local educators and industry representatives participated in a written survey as an initial validation of the revised standards. For each career cluster, educators and industry representatives in that career area rated all employability, technical, and academic standards in the career cluster set for importance on a scale of "1" or "not important" to "3" or "very important" and provided comments for their ratings. Participants also assessed the

appropriateness of all performance indicators. The focus was on inclusion of all constituencies, high expectations, and workplace relevancy.

Standards Assumptions and Format

Our approach to developing standards was to identify broad career-technical rather than job-specific skills, that are common to a group or cluster of similar occupations, highlighting the integration of academic and vocational content. This approach helps provide students with a general understanding of "all aspects of an industry", which was a component of the career academy programs. Thus, the standards specified in broad terms the knowledge and skills necessary for initial success in each program area (grades 13-14). They consisted of content standards (specifying what a student would know and be able to do) and examples of performance indicators (products or actions and tasks that provide evidence of success).

Our standards format included three different types or levels of standards. Each type or level is briefly described below, followed by a sample standard of that type from a one of the career clusters.

Employability Skill Standards – These skills and qualities are foundational to occupations in the cluster.

Sample Standard:

Public Safety and Human Services Employability Skill Standard	**Thinking and Problem Solving** Students will exhibit critical and creative thinking skills, logical reasoning, and problem solving. They will recognize problem situations, identify, locate, and organize needed information, and propose, evaluate, and select from alternative solutions.
Performance Indicators	• Conceptualizes a problem in terms of its relationship to the individual clients' goals/needs and to those of the program [Mathematics 5] • Formulates individualized client plans (including the client to the degree possible) based on pertinent factors [Language Arts 4B] • Recognizes signs of progress that are appropriate and realistic for their client population • Compiles, interprets, and calculates statistical information using deductive reasoning and empirical thinking [Mathematics 4-5]

Technical Content Standards – These standards define general knowledge and skills – not job-specific skills – that are common across the multitude of occupations within the cluster.

Sample Standard:

Education Technical Content Standard	**Safe, Healthy Learning Environments** Students will understand how violence, drugs, and unhealthy environments can affect child development and education. They will demonstrate how to promote good nutrition, health, and safe learning environments for children.
Performance Indicators	• Demonstrates understanding of the regulations and procedural requirements for child health, safety, prevention, and reporting of abuse and how they apply in the workplace • Is cognizant of the principles of good nutrition, food groups, and sources of nutrients when planning menus [Science 2F] • Understands physical and environmental safety issues in school or the workplace • Demonstrates the ability to structure a play or learning environment that minimizes hazards

Academic Standards – The academic standards represent generic academic skills that support the career cluster. These standards have been synthesized from the district-adopted standards and highlight academic content in a discipline identified as important to this career cluster by the development teams. The performance indicators are examples of how the general academic skills can be contextualized by career-specific content.

Sample Standard:

Health and Bioscience Academic Standard	**Science** Students will demonstrate understanding of physics (e.g., motion and forces, waves, and electronic and magnetic phenomena), chemistry (e.g., atomic and molecular structure, chemical bonds, conservation of matter and stoichiometry, gases, acids and bases, solutions, and organic and biochemistry), biology/life sciences (e.g., cell biology, genetics, ecology, and structure and function in living systems), and earth sciences and the connections and application of these concepts as they relate to health and bioscience.
Performance Indicators	• Explains basic scientific concepts as they relate to health and safety in health care and biotechnology environments [Science 1A-J, 2A-G, 3A-K, 4A-e] • Demonstrates understanding of the impact of technology and science as they have contributed to the development and refinement of health care and biotechnology systems and process [Science 1A-J, 2A-g, 3A-K, 4A-E] • Explains the impact of science (e.g., historical and contemporary contributions) and interactions between science and society in relation to health care and bioscience [Science 1A-J, 2A-G, 3A-K, 4A-E] • Explains the individual and social implications of epidemiology (e.g., in relation to disease processes, transport processes, immunology and biological specificity, homeostasis and negative feedback) [Science 1A-J, 2A-G, 3A-K, 4A-E]

You may note that the academic standards adopted by the district in Language Arts, Mathematics, History/Social Science, and Science were cross-referenced to related performance indicators to enhance their usability. The academic standards included with the career cluster standards are content summaries of the district-approved content standards contextualized by the career cluster. The academic standards are intended to serve as a general indication of how the academic standards support learning in the career cluster, with the cross-referencing to be used to match to specific academic content standards for development of curriculum, instruction, and assessments.

Results

Following reiterative drafting, review, and revision of the standards for the twelve different career clusters, we moved forward into an external validation process. The industry/education partnership supporting the standards development work consisted of the school district's school-to-career office, the local community college district (2-year colleges), a state college (a 4-year college), and a range of industry partners. Validation surveys were distributed to appropriate respondents within each partner. The criteria for distribution included the respondent not having participated prior in development or review of the standards and an effort to provide as equal a representation from each partner group within a career cluster as possible (2-year colleges, 4-year colleges, industry, high school). From nine to forty-two respondents participated in the validation survey for each career cluster group.

Results indicated that the standards identified essential knowledge and skills for each career cluster. Respondents rated almost all single employability and technical content standards as 2.0 or higher ("Important" to "Very Important"). Four of the twelve career clusters included standards unanimously given the top rating of 3.0. Respondents were also asked to judge the appropriateness of each standard's performance indicators and provide feedback for revising the performance indicators to make them more appropriate for the targeted grade levels or career area.

Working with the district and the leadership team for the partnership a criterion of 2.0 was identified for inclusion in the final standard sets. For those standards considered to be essential by the leadership team but not receiving average ratings at the cut-off point, minor revisions were made that incorporated feedback from the surveys. When appropriate, suggestions for revisions to the performance indicators were also incorporated.

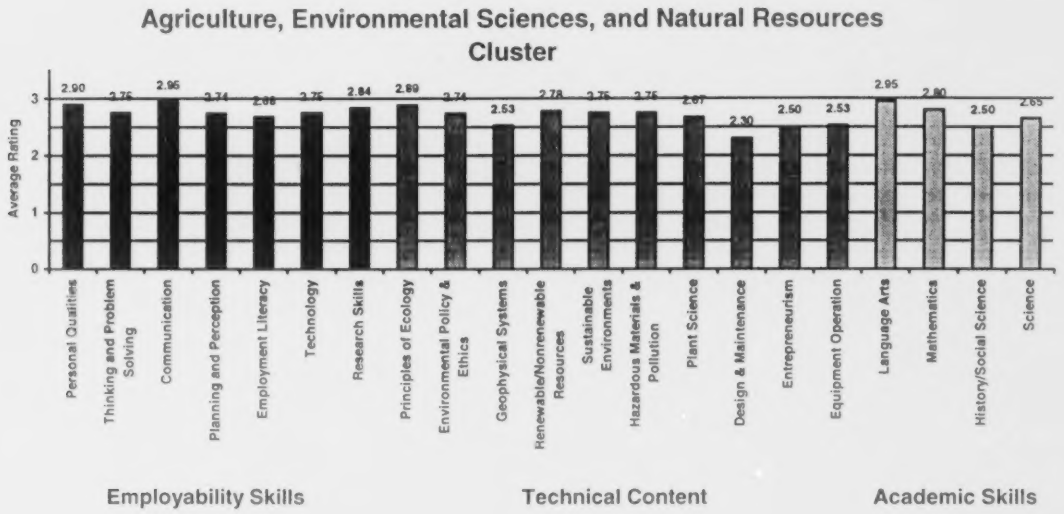
The standards were validated at the local level and will be used initially for curriculum development and integration of employability, technical, and academic content by teachers in the career academies.

The results for each cluster will be presented separately.

Agriculture, Environmental Science, and Natural Resources

The development group for this career cluster included ten participants from this occupational area: five community college teachers, two high school teachers, and three industry representatives. The standards reflect a "hands-on" approach to the study of biology, ecology, and technology as it applies to natural resources production and the environment.

The validation sample for this cluster consisted for twenty respondents; about one-half were high school teachers (55%). Respondents also included four 2-year college faculty (20%), three 4-year college faculty (15%), and two industry representatives (10%). As shown in the table below, all standards received an average rating greater than 2.0 ("Important" to "Very Important").



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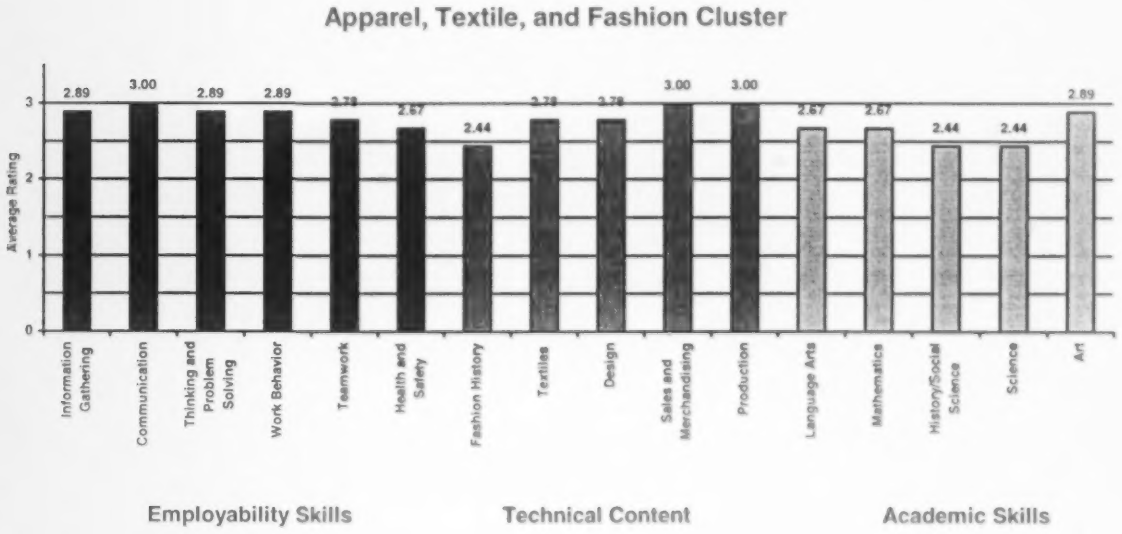
Apparel, Textile, and Fashion Cluster

This development group included seven participants drawn from this occupational area: three community college teachers and four industry professionals. Fashion careers include designing; merchandising, marketing, and retailing; and garment assembly and production. The standards reflect the need for workers in this industry need to be aware of their role in the overall design and production process, as well as technological advances in the industry.

The validation group for these standards included nine respondents, primarily high school teachers (78%). In this particular career cluster, no industry representatives participated in the survey, however, there was strong industry involvement in the development and review process. As shown in the table below, all standards received an average rating of "Important" to "Very Important" (i.e., mean rating 2.0 or greater).



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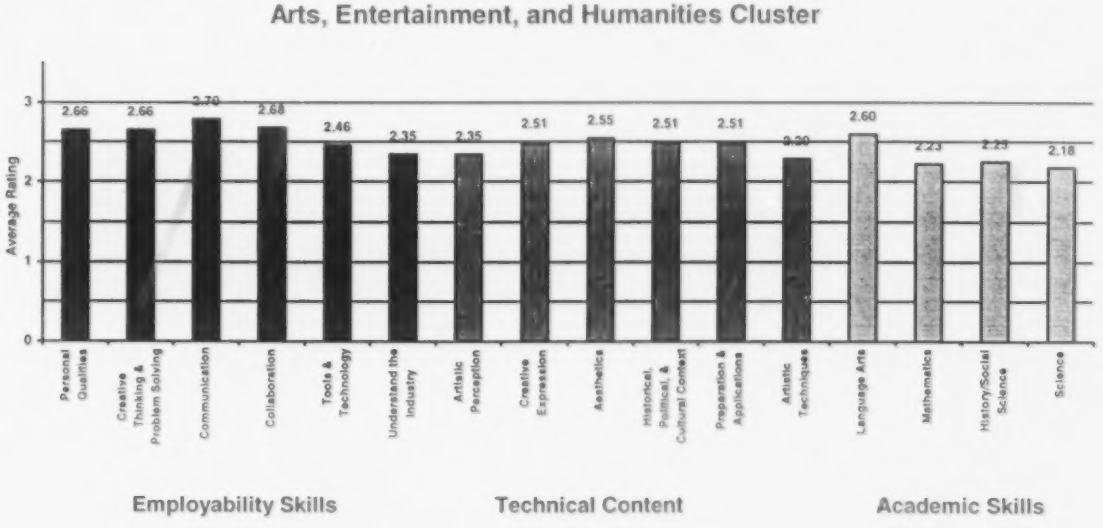
Arts, Entertainment, and Humanities Cluster

This development group included twelve participants including two community college teachers, four high school teachers, and six industry representatives. The career cluster encompasses an extensive array of occupations. Potential jobs within the career pathway include actors, architects, artists, authors, composers, dancers, graphic artists, journalists, musicians, professional photographers, teachers, set designers, commercial artists, computer artists, and art directors.

The validation group for this career cluster included thirty-eight respondents with the largest partner group being the high school teachers (50%). Other respondents included twelve 4-year college faculty (31%), five 2-year college faculty (13%), and two industry representatives (5%). Again, all standards received average ratings greater than 2.0 or "Important to "Very Important". Average ratings tended, however, to be a little lower than some of the other groups, possibly due to the very broad range of knowledge and skills required for occupations in this cluster (i.e., it was more difficult to identify a core set of standards for this group).



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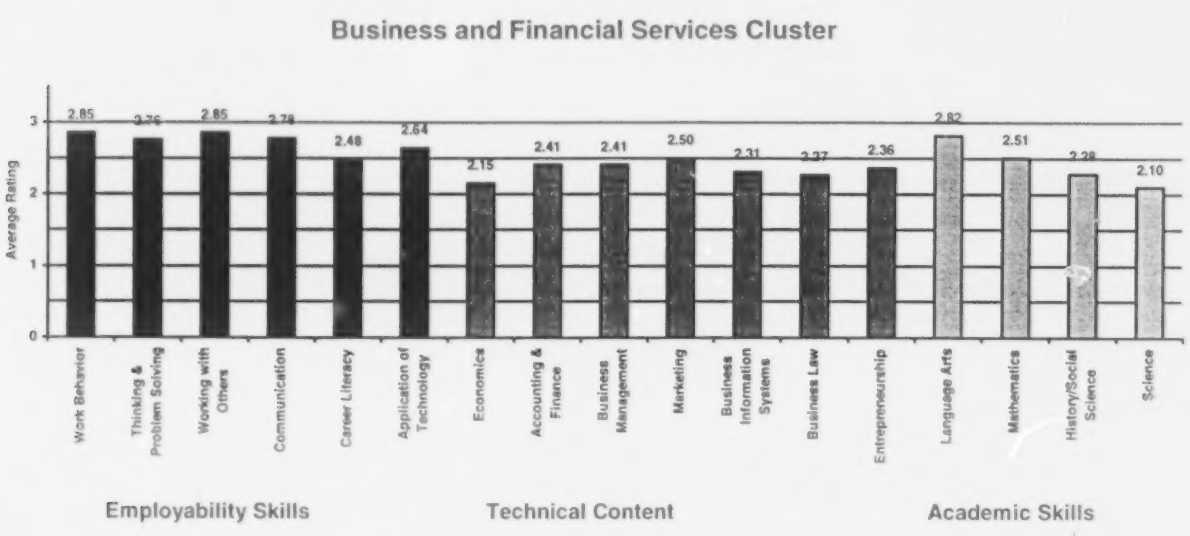
Business and Financial Service Cluster

This development group included nine participants: two community college teachers, two high school teachers, and five industry professionals. Business careers fall into a variety of areas: Administration and Management, Accounting, Banking and Finance, Sales and Marketing, Customer and Personal Service, Real Estate, Trade, Travel, Office Administration, and Human Resources. The business world is placing increasing responsibility on entry-level positions and have changed their employment criteria to include more broad-based skills for all workers.

The validation group for this career cluster included thirty-four respondents: fifteen high school teachers (44%), eight 4-year college faculty (24%), five 2-year college faculty (15%), and six industry representative (18%). Again, all standards received an average of greater than 2.0.



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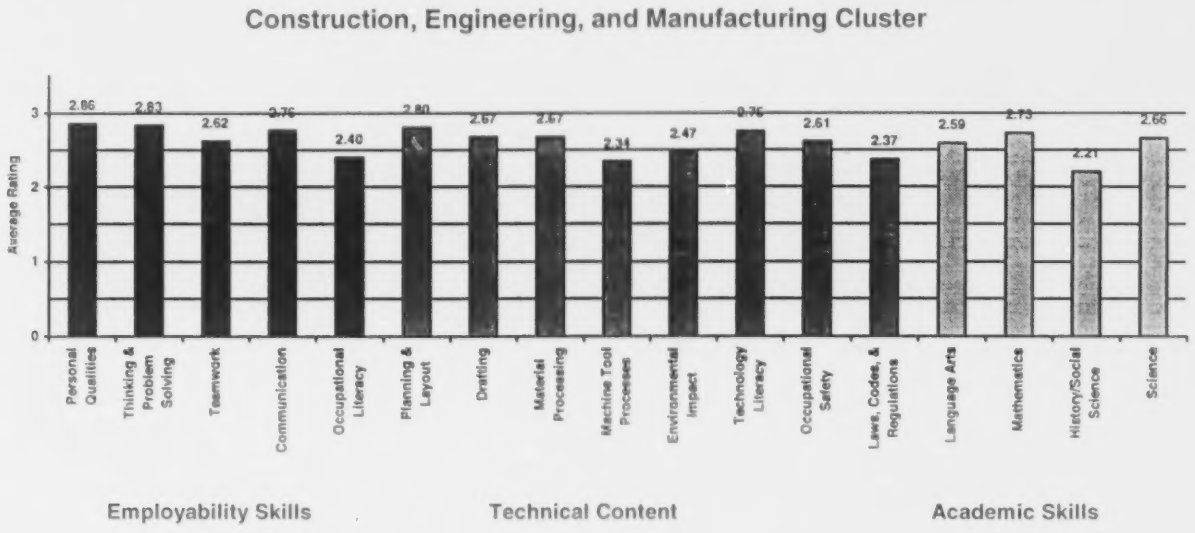
Construction, Engineering, and Manufacturing Cluster

This standards development group included nine participants: one community college teacher, two high school teachers, and six industry professionals. This career cluster includes a vast range of occupations, including architects, contractors, operating engineers, construction managers, carpenters, and furniture makers. The industry has a large number of small employers and is subject to both economic and seasonal swings, thus, workers need a broad set of skills.

The validation group for this career cluster included forty-two respondents: twenty high school teachers (48%), eleven 2-year college faculty (26%), eight 4-year college faculty (19%), and three industry representatives (7%). All average ratings were greater than 2.0.



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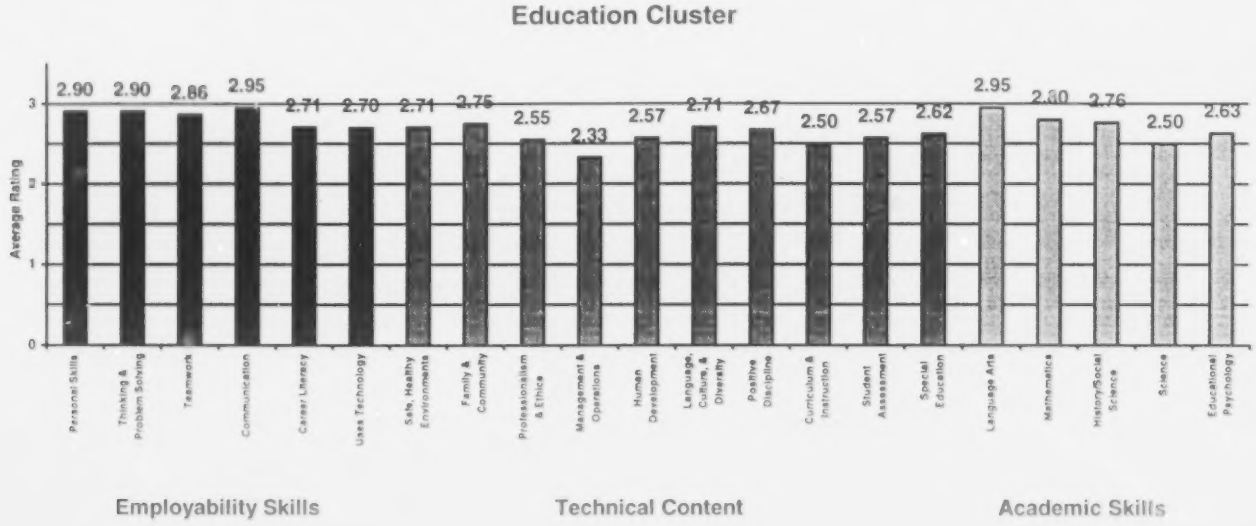
Education Cluster

The standards development group for this career cluster included five participants: three community college teachers/administrators and two industry professionals. Education and child care careers primarily focus on working with children and youth. Careers in education typically include elementary and secondary teachers, paraprofessionals and teaching assistants, working in public or private schools, and child care centers.

The validation group for this career cluster included twenty-one respondents: nine 4-year college faculty (44%), seven high school teachers (33%), four 2-year college faculty (19%), and one industry representative. All average ratings were greater than 2.5 for standards in this career cluster.



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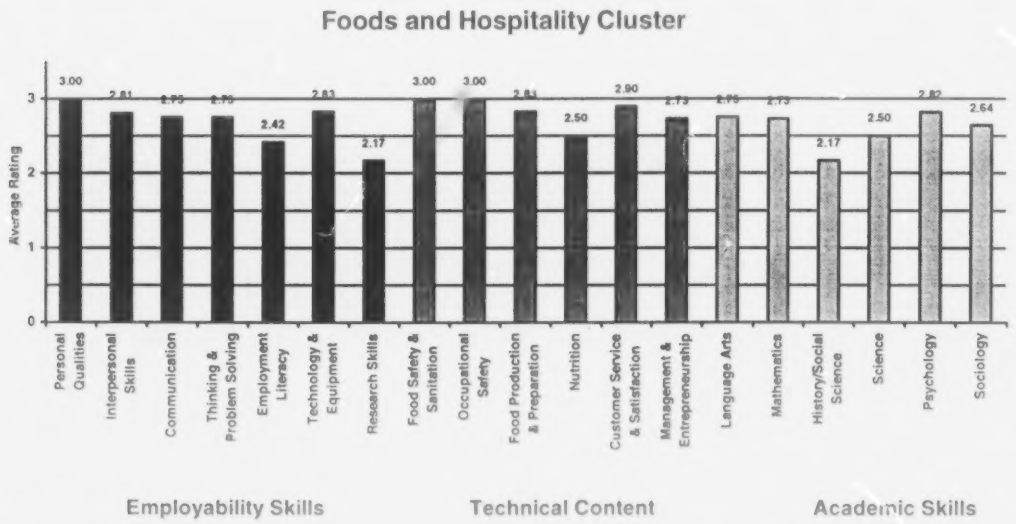
Foods and Hospitality Cluster

The standards development group for this career cluster included nine participants: three high school teachers, one community college teacher, and five industry professionals. Foods and Hospitality is one of the largest industries in the nation and includes a variety of different career opportunities. Potential careers include chefs and cooks, bakers, butchers, food preparation workers, food service managers, caterers, dieticians, nutritionists, food engineers and scientists, and food and hospitality service people.

The validation group for this career cluster included twelve respondents: five 2-year college faculty (42%), four high school teachers (33%), two 4-year college faculty (17%), and one industry representative. Average ratings were greater than 2.0 for all standards, with three standards at 3.0.



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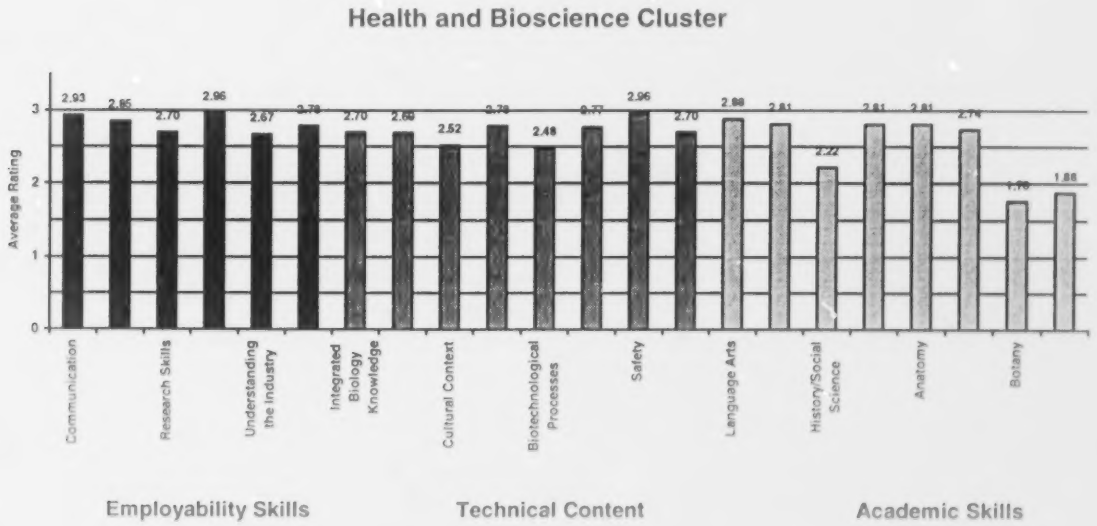
Health and Bioscience Cluster

This standards development group included five participants: two high school teachers and three industry professionals. Health care careers fall into four service areas: Therapeutic, Diagnostic, Information Services, and Environmental Services. Some health careers focus on patient care while others do not, such as careers in biotechnology.

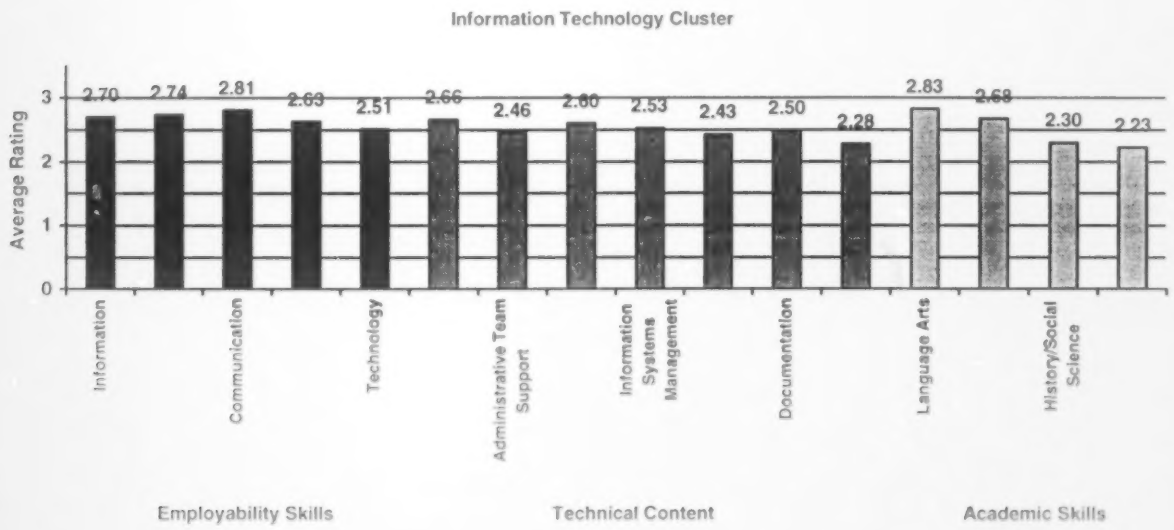
The validation group for this career cluster included twenty-eight respondents: ten high school teachers (36%), eight 4-year college faculty (28%), five 2-year college faculty (18%), and five industry representatives (18%). All standards received average ratings of 2.5 or greater, except two "other" academic disciplines, Botany and Zoology. These disciplines were dropped as separate standards and embedded in the standards in the performance indicators.



Information Technology Cluster

The standards development group for this career cluster included five participants: three high school teachers and two industry professionals. This career area encompasses working in manufacturing of technology equipment as well as work in computer software firms, data processing firms, banks, insurance companies, accounting firms, and government agencies. Occupations are varied and include computer engineer, data analyst, technical writer, multimedia programmer, hardware and software support, desktop publisher, network security, web programmers, information systems specialists, computer programming, and data processing.

The validation group for this career cluster included thirty-eight respondents: twenty-five (66%) were high school teachers. Other respondents included five 4-year college faculty (13%), five 2-year college faculty (13%), and three industry representatives (8%). Average ratings for all standards were greater than 2.0.



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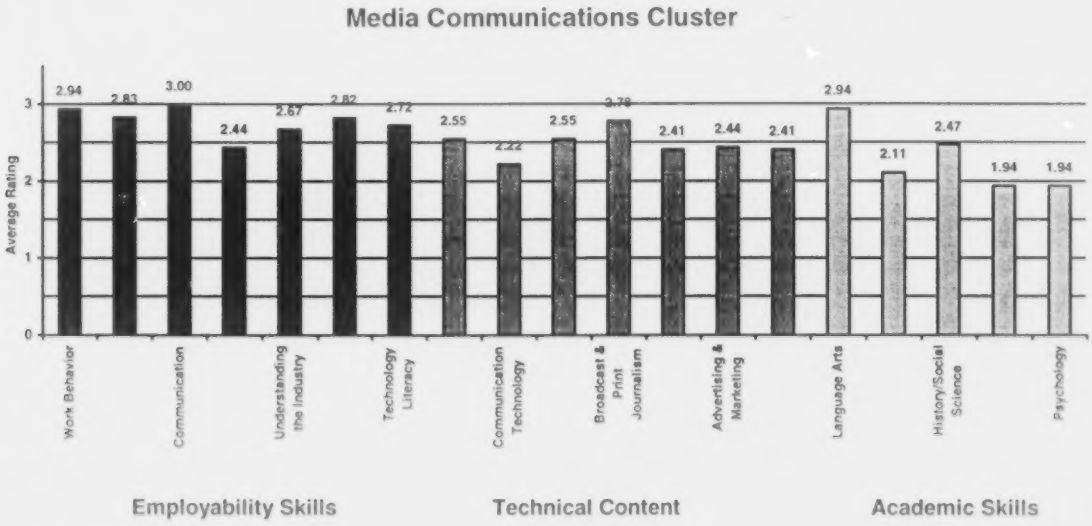
Media Communication Cluster

This standards development group included thirteen participants: two high school teachers, one community college teacher, and ten industry professionals. Potential jobs within this career pathway include commercial and graphic artists, commercial and news photographers, film editors, film development technicians, camera operators, journalists, news directors, newscasters, announcers, news writers, magazine writers, media consultants, television, film, and video producers, public relations representatives, advertising executives, cable television operators and technicians, and communications directors.

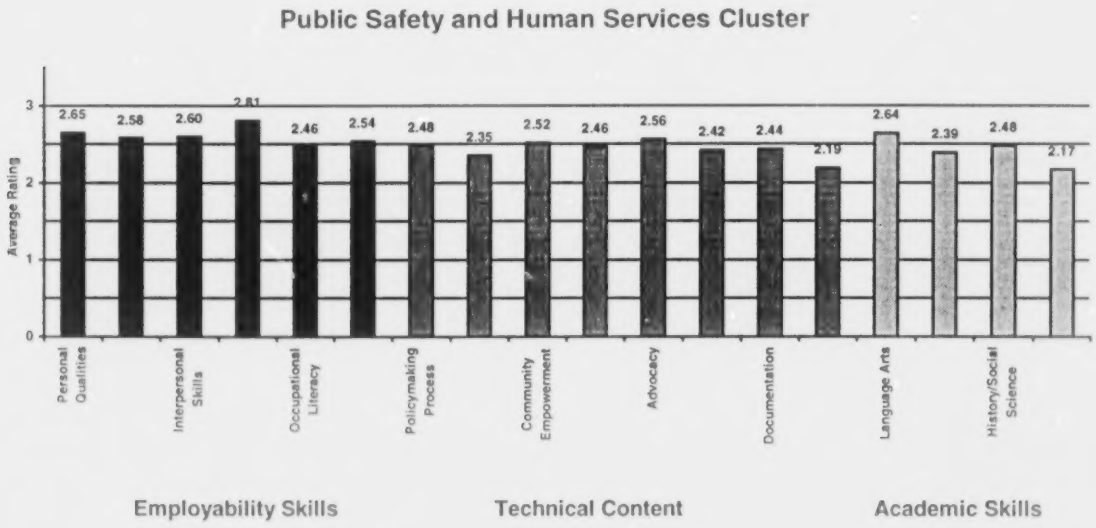
The validation group for this career cluster included eighteen respondents: over one-half were high school teachers (56%). Other respondents included two 2-year college faculty (11%), two 4-year college faculty (11%), and four industry representatives (22%). All average ratings were 2.0 or greater except in two academic content areas (Science and Psychology received average ratings of 1.94). These two standards were considered important by the leadership team and retained in the standard set despite the marginal ratings.



Public Safety and Human Services Cluster

This standards development group included ten participants: two community college teachers and eight industry professionals. This broad career cluster includes such occupations as human services workers, parole officers, paralegals, law enforcement officers, drug abuse counselors, and government officials. Depending on the occupation, the types of clients and people served by these workers vary greatly.

The validation group included twenty-six respondents; over one-half were 4-year college faculty (54%). Other respondents were five high school teachers (19%), three 2-year college faculty (11%), and four industry representatives (15%). All standards received average ratings greater than 2.0. The Assessment and Counseling technical content standard (average rating, 2.19) was reworked slightly based on feedback through the validation survey.



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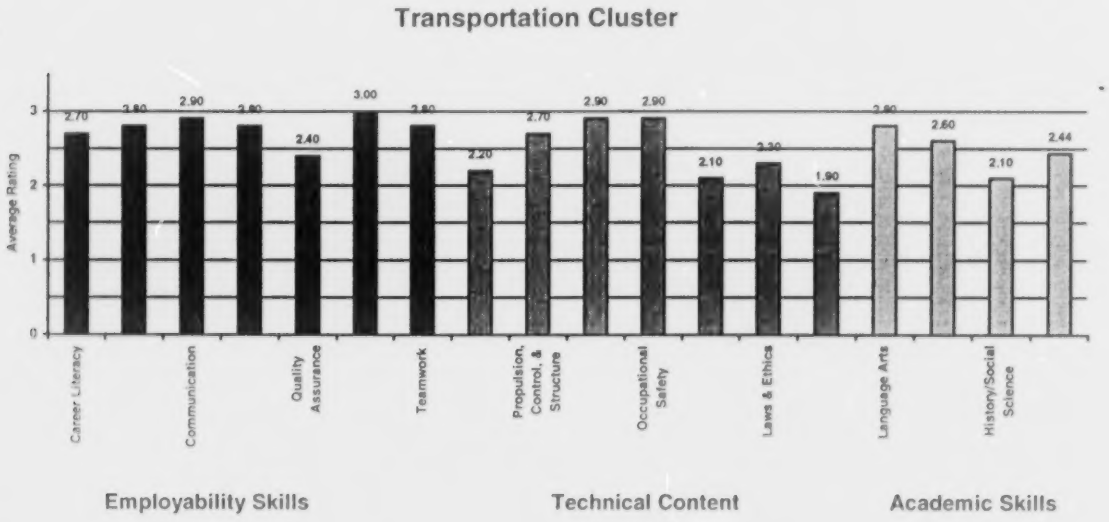
Transportation

This standards development group included five participants: one high school teacher, one community college teacher, and three industry representatives. Some occupations that fall within this career cluster are automotive technicians, bus and truck technicians, diesel engine specialists, aircraft pilots and flight engineers, and aircraft mechanics.

The validation group for this career cluster included ten respondents: one-half were 2-year college faculty. Other respondents were three 4-year college faculty (30%), one high school teacher, and one industry representative. All standards received an average rating of greater than 2.0 except one technical content standard, International Business, with an average rating of 1.9. This standard was deemed essential for one of the career academies which focuses on trade and travel and, thus, retained in the standard set.



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General Issues

As the standards development process proceeded some general issues emerged from across the career clusters. These issues included:

- The targeted levels of performance described in the performance indicators can be problematic when students are articulating into tech prep programs. The standards need to reflect what high school students should know and be able to do, but also be rigorous and demanding enough to assure articulated progress to community college or even 4-year college programs. Defining different levels for performance, which could be buttressed with student work exemplars overtime is a helpful strategy.

- Often the "cut" on economic areas is different at the local area in response to local industry and job availability. This results in a tension between tailoring courses and content to reflect the local concerns without neglecting the broader content of the career area (i.e., agriculture may focus on plant science and environmental studies in urban settings not on animal science which is the focus in more traditional programs).

- When the career cluster area was very broad (i.e., spanned more than one occupational area) there was difficulty representing the breadth of the cluster. In some groups, representatives from one occupational area wanted that occupational area "beefed-up" in the standards (e.g., the combined area of Health and Bioscience).

- Industry partners represent cutting edge technology while education partners remain behind the wave. Particularly in career clusters where technology plays an important role, industry representatives may espouse more advanced knowledge and skills than teachers are familiar with or require from students. For example, the information technology industry functions in a high-tech world of data transfer and international/global technology. This is necessary to remain competitive. High school teachers in the partnership, however, were uncomfortable with the language and skills required by this newer model.

- To foster the development of strong school-to-career partnerships it is important that all career areas are supported by industry partners that provide industry input, job experience opportunities, and internships/mentorships for students. In this partnership, one-third of the cluster areas had an active business partner that hosted the focus group meeting for their group. In contrast, it was difficult to get participation from industry in other career clusters.

Conclusions/Implications

The vision of a comprehensive, diverse school-to-career program with rigorous academic expectations for students requires diverse industry partnerships and strong community ties. Using an inclusive process for development of meaningful, relevant, and appropriate career cluster standards can be a vehicle for bringing education and industry partners together. Such efforts can highlight potential difficulties in identifying and developing standards for diverse career clusters. Awareness of these issues can be helpful to others engaging in this work.

Ultimately, career-technical standards for school-to-career systems must be useful for teachers, enable students to have high but achievable learning targets, and represent learning goals for students that are meaningful from an industry perspective.

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